

**First Operation and Effect of a New Tandem-Type Ion Source
Based on Electron Cyclotron Resonance**

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A new tandem type source has been constructing on the basis of electron cyclotron resonance (ECR) plasma for producing synthesized ion beams in Osaka Univ.[1] Magnetic field in the first stage consists of all permanent magnets, *i.e.*, cylindrically comb shaped one[2], and that of the second stage consists of a pair of mirror coil, a supplemental coil and the octupole magnets. Both stage plasmas can be individually operated, and produced ions which energy controlled by large bore extractor also can be transported from the first to the second stage. We investigate the basic operation and effects of the tandem type ECR ion source (ECRIS). Analysis of ion beams and investigation of plasma parameters are conducted on produced plasmas in dual plasmas operation as well as each single operation. We describe construction and initial experimental results of the new tandem type ion source based on ECRIS with wide operation window for aiming at producing synthesized ion beams as this new source can be a universal source in future.

References

- [1] Y. Kato, Y. Kurisu, D. Nozaki, K. Yano, D. Kimura, S. Kumakura, Y. Imai, T. Nishiokada, F. Sato, and T. Iida, Review of Scientific Instruments, 85 (2014) 02A950-1-3.
- [2] T. Asaji, Y. Kato, F. Sato, T. Iida, and J. Saito, Review of Scientific Instruments, 77 (2006) 113503-1-6.